SOIL SURVEY OF THE MOUNT MITCHELL AREA, NORTH CAROLINA.

By THOMAS A. CAINE and A. W. MANGUM.

LOCATION AND BOUNDARIES OF THE AREA.

The region surveyed is a rectangle lying between 82° and 82° 30′ west longitude, and 35° 45′ and 36° north latitude, and includes most of Yancy and Mitchell counties and parts of Madison, Buncombe, and McDowell counties. The area contains about 500 square miles and is located in the highest part of the United States east of the Rocky Mountains. (See fig. 5.)

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

After the close of the French and Indian wars and after the expulsion of the French and Spanish from the South, the Scotch and Scotch-Irish began to immigrate to North Carolina and South Carolina in great numbers. In North Carolina a few settled in the eastern part of the State, but most of them went to the higher mountain lands to the westward, probably because the climate was more congenial to them.

These people were naturally hardy and brave, and soon wrested the lands from the Indians and carved prosperous settlements out of the wilderness. They kept pushing westward to the higher country over the Blue Ridge. In the area surveyed the inhabitants nearly all trace their ancestry to these early Scotch-Irish settlers.

The great tides of immigration passing into the United States during the last century seem to have moved along lines of latitude westward, and the South has been remarkably free from the infusion of foreign elements. The reason is probably due somewhat to climatic conditions and also to the better facilities of travel through the waterways of New York and along the Great Lakes to the West. Here in this mountain country is probably to be found the purest strain of American blood in the United States.

The country is very rugged, and transportation and travel very difficult. The lines of travel were through the valleys, along the lines of least resistance. In these valleys the soils are more fertile and easily worked, and hence they were the first to be taken up. In time the valleys became cleared throughout their length, and often the lower slopes of the adjoining mountains were put under cultivation.

Where the valleys were wide and fertile enough to support several families a settlement grew up, which afterwards became either the center of a township or of a county.

For generations the settler bought little and sold little, because of the distance from market. A little dependence was placed on hunting and fishing, but the chief source of revenue was cattle and hogs. No fences were required, except to protect the garden and corn patch. The stock was branded and turned loose in the mountains, the cattle living upon the grass and the hogs feeding upon the abundant mast. As a class the people never have been wealthy, but are all about on an equality. For generations they have been content with making a good living, without accumulating for their children or keeping pace with agriculture in other sections of the State.

The conditions for slavery were never favorable in this section, and the community was affected very little by the civil war.

This region has been contributing for generations a sturdy class of emigrants, who have gone out and helped to build up the Southwest, as they are now going into the Northwest. If this mountain region of such great possibilities has been behind in development, it is because of lack of railroad facilities and the difficulty of travel. Its possibilities and the capability and industry of the people are shown in the vicinity of Asheville, and the changes there have all been wrought since that town became a railroad center.

In the parts of the area farthest removed from the railroads, however, the people have not changed greatly. The log cabin is still about the only dwelling, and the mountaineer is still content with barely making a living, apparently not caring for the rapid advance his competitors in other parts of the State are making.

CLIMATE.

The difference in the altitude of that part of the area lying in the plateau south of the Blue Ridge Mountains and that which lies north and west of the Blue Ridge causes a great difference in the climatic conditions of the two principal physiographic divisions of the area surveyed. There are no Weather Bureau stations within the area, but the records of the station at Linville, a few miles northeast of the area, show the climatic conditions of the mountainous section, while those of Marion, situated just south of the area, show the conditions as they exist in the lower plain, south of the mountains. The climate of the mountainous section is much the cooler, and the season for growing crops is shorter, frosts coming much earlier in the fall and occurring later in the spring. Although the winters are colder than those of the Piedmont Plateau, they are comparatively mild. The mild winters, cool summers, and the pure, dry mountain atmosphere

cause the climate of the whole area to be considered one of the most healthful in the Southern States.

The following tables give the temperature and precipitation, and the occurrence of killing frost at the stations already mentioned:

Temperature and precipitation.

Month.	Linville.		Marion.	
	Temperature.	Precipitation.	Temperature.	Precipitation.
	°F.	*Inches.*	°F.	*Inches.*
January	31.0	3.08	37.6	3.84
February	31.0	4.08	42.0	4.24
March	40.5	.....	49.1	3.39
April	42.2	.....	57.6	3.07
May	55.7	.....	66.0	5.22
June	62.4	.....	72.3	4.91
July	66.1	.....	80.7	5.91
August	64.9	.....	73.3	4.01
September	58.7	4.59	.....	.....
October	47.3	1.86	58.1	4.44
November	41.4	5.58	48.7	3.66
December	34.8	5.60	40.4	2.68
Year	48.6	.....	.....	.....

Dates of killing frosts.

Year.	Linville.		Marion.	
	Last in spring.	First in fall.	Last in spring.	First in fall.
1896	Apr. 11	Sept. 24	Apr. 9	Oct. 19
1897	May 27	Sept. 21	Apr. 21	Nov. 13
1898	May 10	Oct. 16	Apr. 28	Oct. 23
1899	Apr. 17	Sept. 22	Apr. 17	Oct. 1
1900	May 11	Nov. 5	Apr. 5	Nov. 9
1901	Apr. 24	Sept. 20	Mar. 29	Nov. 6

PHYSIOGRAPHY AND GEOLOGY.

The great Appalachian Mountain system, which extends in a northeastern-southwestern direction from Maine to Alabama, reaches its highest elevation in western North Carolina. This region of highest elevation may be considered as a plateau, with an average altitude of about 3,000 feet, of which the Blue Ridge forms the eastern boundary and the Smoky Mountains the western boundary. Resting upon this plateau are numerous cross chains, extending at right angles to the general trend of the system and rising in some instances to over 3,000 feet above the plateau itself. (See Pl. IX.)

It was in the midst of this high mountainous region that the survey was carried on, and the area included one of the most massive and

conspicuous of these cross chains, namely, the Black Mountains, in which is Mount Mitchell, the highest point in the United States east of the Rocky Mountains. The lowest point in the area is on the north fork of the Catawba River, at the foot of the Blue Ridge Mountains, and is but 1,350 feet above tide water, while 15 miles west, in an air line over the Blue Ridge, Mitchells Peak rises to an elevation of 6,711 feet above tide. The ruggedness of the country, the difference in climatic conditions, and the consequent diversity in agricultural interests can be appreciated when we consider that the highest part of the area is a mile higher than the lowest part. Some of the mountain slopes are so steep as to render their cultivation unprofitable, or in places even impossible, but all of these slopes and even the tops of the highest mountains are usually covered with a deep, rich soil, which is often held in place by a thick growth of original forest. On the plateau the cross chains are sometimes broken down, but there are no broad and well-defined valleys. Extending along the plateau east and west from Gillespie Gap to Cane River there is a depression formed by the breaking down of the cross chains. Viewed from an elevation it gives the appearance of a valley, though it is crossed by numerous streams and small ridges. The streams which cross this depression do so nearly at right angles, and go with an even flow through their narrow, winding valleys. Freshets are so frequent in these valleys that conditions are not usually favorable for the accumulation of sand and silt along the stream courses. The valleys are being cut deeper. The stream courses are strewn with rocks of all sizes. Near their source the rocks are large and angular, while farther down they become smaller and less angular. Where the mountain valleys are wide enough to favor the accumulation of sand and silt along the stream courses this "made" land is very valuable, and where there is enough of it it is usually the center of a settlement or township, as, for example, at Pensacola, in Yancey County.

There is an excessive amount of rainfall, as would be expected in such high altitudes, but the rugged features and difference in elevation assure good drainage. Every depression in the mountains has a small, sparkling, rapid-flowing stream. The Appalachian Mountains form the chief watershed in the eastern United States, so within the area a part of the rainfall eventually reaches the Atlantic through the Catawba River and a part reaches the Gulf of Mexico through the Mississippi.

In passing through the area one is greatly impressed by the difference in the fall of the streams which flow south and east and those which flow north or west. The former plunge down a series of cascades, through V-shaped gorges, often falling from 1,500 to 2,000 feet before they reach the Catawba River, a few miles below, while the latter, and especially the North and South Toe and Caney rivers, often

flow miles without rough water, sometimes passing through narrow gorges, but more often flowing through smoothly rounded valleys.

It is along these latter streams that there are the greatest possibilities for the development of water power. There are already some small saw and feed mills. The volume of the North Toe and of the lower part of the Cane River is sufficient to furnish power for large manufacturing concerns. As yet the power has not been developed, because there were no railroad facilities, but with the completion of a railroad now being built these possibilities will probably be realized. The nearness of the new railroad to the river banks will in some cases interfere with the construction of dams, but there are several places where the fall is sufficient, where there is an abundance of water, and plenty of room for the construction of a dam, with a good building site for a mill and dwellings, and also where there would be comparative safety and freedom from freshets. The healthfulness of the climate is proverbial. There are plenty of people ready and willing to work, so the question of labor is not difficult of solution.

The rocks of the area are made up of various granites, gneisses, and schists. The granites vary from a coarse pegmatite variety to a fine-grained variety which can hardly be distinguished from a gneiss. The gneisses are mostly of the mica and hornblende variety. Besides these rocks there are some diabase and diorites, and in places considerable calcite. In the vicinity of Woodlawn there are large deposits of a calcite which takes a good polish.

A great deal of the rock in the area is of certain igneous origin. The gneisses and schists were probably of igneous origin, but have been so changed through metamorphism that it can not be said definitely.

Owing to the high elevation of the area, the amount of rainfall is necessarily great and the winters are long and cold. Disintegration is very rapid, and the steep mountain slopes, where they have not been deforested, and the tops of the highest mountains are usually covered with a deep soil. The original vegetation is very dense, and this has aided in holding the mountain soils in place. Deforesting the steep mountain slopes in Buncombe County, while profitable to the owners of the mills, has proved a great injury to the property owners along the stream courses in the low country. Freshets are more frequent, the slopes become gullied, and in time of high water the river-bottom farms in the low country are covered with sand and mud. This was especially true in the spring of 1901. With the cutting off of more timber the probability is that freshets will be more frequent and destructive.

The ruggedness of the country is largely due to the unequal rate of weathering of quartz, or rocks which contain a large percentage of quartz, and the feldspar and calcite rocks. The latter have weathered

rapidly, and the streams have adjusted themselves to the more easily eroded places, forming valleys, while the quartz, or the rocks containing a large percentage of quartz, have resisted these agencies of degradation and stand up, forming the highest mountains.

SOILS.

The following table gives the names, area, and proportional extent of the soils of the area surveyed. Besides the five soil types shown by colors on the map accompanying this report, certain uncolored areas will be found. These represent rock outcrop, the extent of which is also given in the table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Porters clay	98,624	31.0	Meadow	6,976	2.2
Porters black loam	87,808	27.6	Rock outcrop (no soil)	5,184	1.6
Porters sandy loam	76,480	24.1			
Porters sand	42,816	13.5	Total	317,888	

PORTERS CLAY.

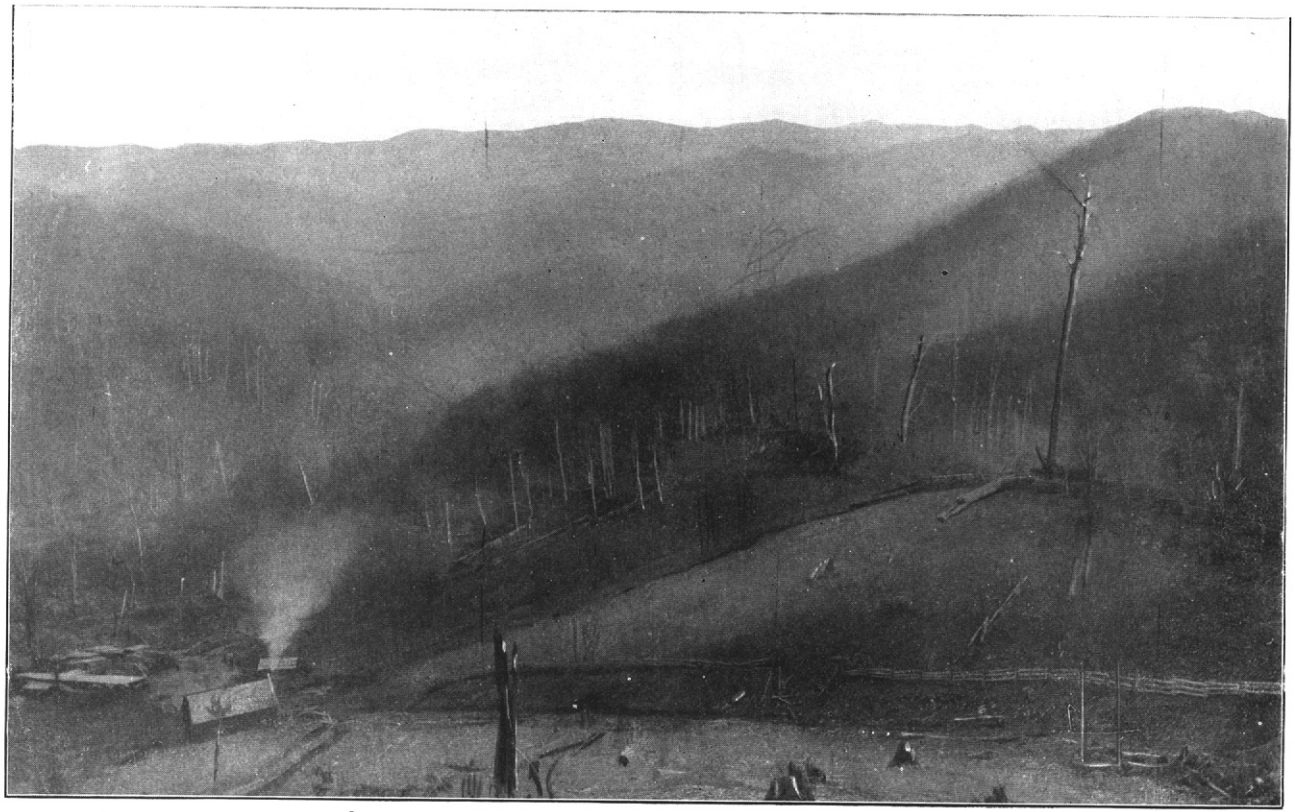
The Porters clay is a clay loam or clay of reddish color, overlying a red clay subsoil. The soil varies in depth from 6 to 10 inches, the depth depending upon situation, whether in level areas or on the mountain sides. The subsoil often extends down several feet before disintegrated rock is reached. Occasionally there are large quantities of quartz scattered throughout the soil and subsoil.

This soil is not confined to any particular part of the area. The largest bodies of it, however, are found in those sections which lie between the higher mountain ranges and the low and rounded ridges. It is also found along the foothills of the higher mountains, and often extends up the southern slope of these a considerable distance. The largest continuous strip of this soil is found in the vicinity of Burnsville and Cane River. The rolling character of its surface assures good drainage. It is drained by the many small streams that rise in the mountains, and often also by the larger streams and rivers.

At one time the Porters clay lying on the north slopes and lower ridges of some of the higher mountains was probably covered by a black loam, but on account of clearing off the timber, cultivation, and washing, the covering has been removed, exposing the red clay below. (See Pl. X.)

The Porters clay is a residual soil derived from the weathering of granite, gneiss, and schist rocks. The range of temperature and abundance of rainfall during the year are so great in this mountain region that the underlying rocks disintegrate very rapidly, forming a deep, rich soil.

Report of Bureau of Soils, U S Dept Agr, 1902



GENERAL VIEW OF THE MOUNT MITCHELL AREA, NORTH CAROLINA.

Showing the very mountainous character of the country, with the narrow valleys for general farm crops, but with numerous coves adapted to fruit farming.

Report of Bureau of Soils U S Dept Agr, 1902.

GULLIES IN PORTERS CLAY ON HILLSIDE WHERE CLEARED OF TIMBER, MOUNT MITCHELL AREA, NORTH CAROLINA.

With the large rainfall of this mountainous area, the steep slopes, and large drainage areas, the soils are very rapidly eroded after the forest is cleared.

The location of this soil, together with its adaptability to all of the general farm crops of the area, makes it on the whole one of the most desirable soils in the mountains for general agricultural purposes. The principal crops are corn, grass, fruits, and wheat. Besides these, sorghum, Irish and sweet potatoes, and vegetables give good yields. The average yield per acre of corn is about 20 bushels; of wheat, about 10 bushels, and of oats, about 30 bushels. Sweet and Irish potatoes yield 200 bushels per acre when properly cared for. Cabbage, turnips, and other vegetables do very well. This soil is capable of a high state of improvement, and retains fertilizers for a long time. Wherever large continuous tracts of it are farmed the general appearance of the region indicates great prosperity. The Porters clay is a stronger soil than Porters sandy loam or Porters sand, and was among the first soils to be taken up when the country was settled.

Upon this type were seen growing some of the best apple orchards in the area. If it can be said that it is especially adapted to any particular crops, perhaps apples, corn, grass, and oats would have to be mentioned first, but every crop grown in the mountains does well upon this soil type without any particular attention.

The following table gives the mechanical analyses of this soil:

Mechanical analyses of Porters clay.

[Fine earth.]

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
7715	Estatoe	Stony loam, 0 to 6 inches.	3.29	3.62	9.32	8.66	22.34	12.80	29.34	13.22
7717	Burnsville	Stiff, tenacious red clay, 0 to 7 inches.	1.10	3.96	9.24	8.00	19.88	9.60	15.06	32.72
7716	Subsoil of 7715	Stiff red clay, 6 to 36 inches.	.57	3.90	9.00	7.68	20.30	12.06	24.56	22.50
7718	Subsoil of 7717	Stiff clay, 7 to 36 inches.	.49	2.22	7.98	7.20	15.20	6.60	17.30	42.90

PORTERS SANDY LOAM.

The Porters sandy loam is a gray sandy loam, overlying a red or reddish-brown clay loam subsoil. The soil has an average depth of about 8 inches. Like the subsoil of Porters clay, the subsoil of this type is often very deep. There are often large quantities of quartz rock strewn on the surface.

This soil is found in one large body in the northern part of the area

and in small patches throughout the area surveyed, except on the higher mountains. It is often found in small patches along the base of the higher mountains and in all locations on the lower mountain ridges and on the rounded hills of the plateau between the high ridges. Next to the Porters clay this is the most extensive soil type of the area.

The numerous small streams in the area and the elevated position of the type insure good drainage, but if not carefully handled the loose, sandy nature of the soil and the somewhat loose, fluffy nature of the subsoil of the type make it subject to washing and gullying. In some few places, where the top soil had been removed from large areas by washing, the soil had to be classed as Porters clay. In a few such places the fields have been abandoned because they are so badly gullied. When such is the case the farmers usually clear off new tracts near by.

This type, like the Porters clay, is derived from the weathering of granite, gneiss, and schist rocks. The sand and quartz rocks strewn on the surface and mixed with the soil and subsoil are accounted for by the greater resistance to weathering, characteristic of this material.

The Porters sandy loam is used for corn, wheat, oats, sorghum, fruits, and vegetables. In fact, it is used nearly as successfully for all purposes as the Porters clay. With proper methods of cultivation it seems better adapted to corn, sweet and Irish potatoes, and peaches than the clay soil, but it does not retain fertility as long, because the subsoil is more porous. To keep it in a high state of productiveness requires constant application of fertilizers. In many locations it would seem that the surface has a greater tendency to wash than has the Porters clay.

The average yield per acre of corn is about 25 bushels; of oats, about 30 bushels; and of wheat, about 8 bushels. Sweet and Irish potatoes, where given the best cultivation, yield over 200 bushels per acre. Potatoes seem to do especially well, being larger, sounder, and smoother than those grown upon the less sandy soils. Formerly some tobacco was grown successfully upon this soil, but now no attempt is made to grow this crop. If climatic conditions were right this would be an excellent soil for cotton. No cotton is grown within the area. In the vicinity of Democrat this soil is used to produce tomatoes to supply the local canning factory.

The table following gives the mechanical analyses of soil and subsoil of this type.

Mechanical analyses of Porters sandy loam.

[Fine earth.]

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
7727	Democrat	Grayish loam, 0 to 8 inches.	1.22	6.20	12.56	9.14	17.38	20.14	23.84	10.16
7725	Barnesville	Grayish-yellow loam or sandy loam, 0 to 8 inches.	1.48	6.04	12.40	9.22	17.04	18.38	25.26	11.54
7729	Pensacola	Grayish-yellow loam, 0 to 7 inches.	5.69	9.50	12.50	7.70	13.48	11.14	24.66	21.18
7730	Subsoil of 7729	Reddish loam or clay loam, 7 to 36 inches.	1.05	6.64	10.86	8.68	16.52	13.20	28.26	15.46
7728	Subsoil of 7727	Reddish loam or clay loam, 8 to 36 inches.	.27	6.20	9.56	6.82	14.82	18.82	19.58	23.92
7726	Subsoil of 7725	Reddish clay loam, 8 to 36 inches.	.70	8.04	10.56	6.50	11.60	9.92	22.84	30.76

PORTERS BLACK LOAM.

The Porters black loam is a loose, black loam, usually overlying a clay subsoil. It contains a large proportion of organic matter in different stages of decomposition and ranges in depth all the way from 6 inches to 3 or 4 feet. The subsoil is usually of a reddish color.

In the present area this type is found on all the high mountains, especially on those which have never been cleared and on which the slowly decomposing organic matter has been collecting for ages. The largest bodies of this soil are found in the mountains of the northwestern and southern parts of the area, but it is also found in smaller bodies in all of the mountains, and especially in the coves which are protected from the sun. In some of the lower mountains parts of the area which were formerly Porters black loam have been so badly worked and washed that they no longer have the characteristics of this type, but rather those either of Porters clay or Porters sandy loam, and in some few cases the surface has been so badly washed as to expose the underlying rock. In the mountains of Mitchell and Yancey counties the Porters black loam is the most extensive soil type, being found on the high ranges and in almost all of the coves. In these counties this soil extends nearer to the bottoms of the mountains on the north side than on the south side.

The elevation of the Porters black loam, together with its loose, porous nature, assures good drainage. Ordinarily the fertility of this soil is easily maintained, nor does the surface wash, but by improper methods of cultivation it has in a few places been so badly washed as

to exclude it from classification under the type name. Above an altitude of about 3,500 feet none of the area has ever been under cultivation. As these high altitudes are cool and moist the conditions have always been favorable for the accumulation of organic matter derived from leaves, branches, fallen trees, and undergrowth. Hence by far the greater proportion of the region above an altitude of 3,500 had to be classed as this soil type, and since so large a part of the area surveyed is above that altitude the importance of the Porters black loam can readily be appreciated.

In the lower altitudes the possibilities of this type for fruit, especially apples, are being recognized. Several young orchards have been set out recently in the vicinity of Ball Mountain. It is upon this soil, in sheltered coves, that the Albemarle pippin has attained such perfection and fame in the Albemarle region of Virginia. Not many peaches are grown in the area, but they seem to do best upon this soil type.

The fertility and loose texture of this soil seem to adapt it especially to Irish potatoes. In parts of the area where the seasons are sufficiently long it grades next to the meadow land for the production of corn. It is as well adapted to timothy and clover as it is to apples, and for years it has been used as pasture land. It is especially well adapted to vegetables, celery and cabbage doing remarkably well.

This type has long been considered the richest soil in the mountains, and only its inaccessible location has prohibited its more general cultivation.

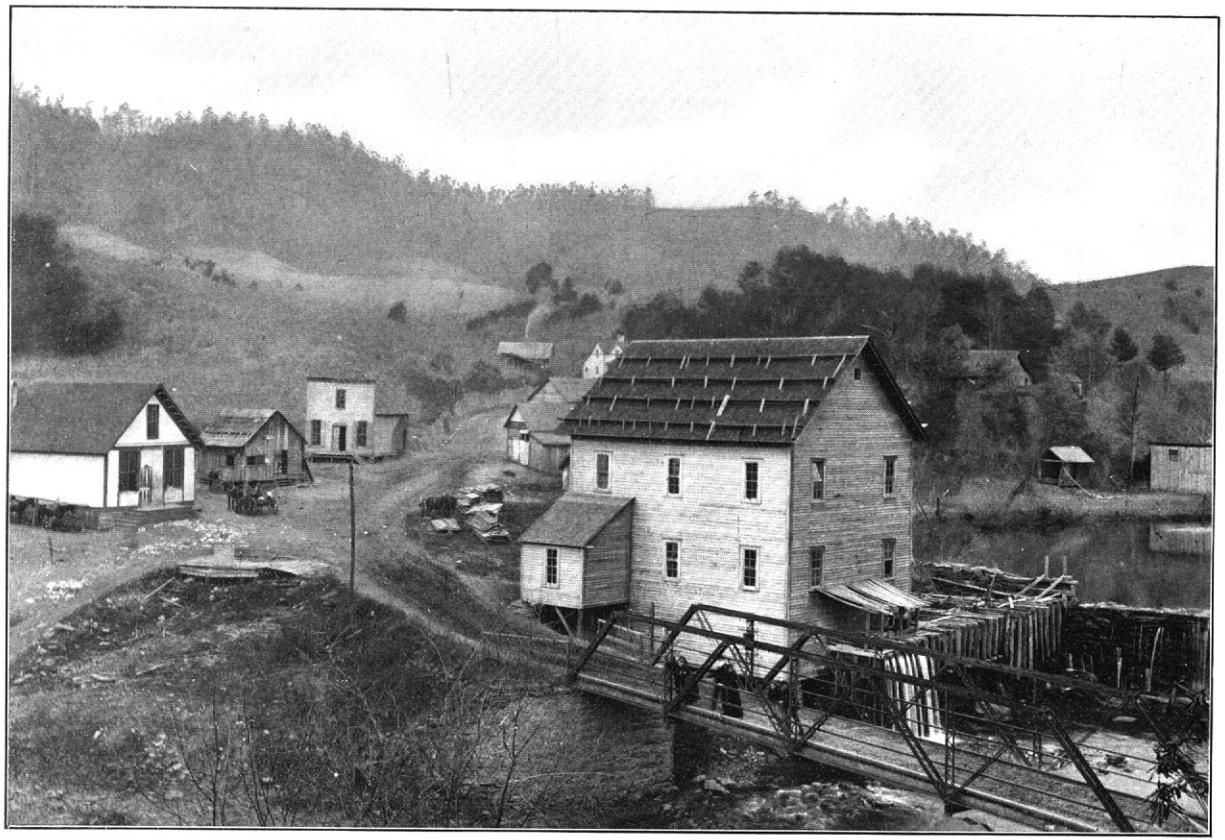
The following table shows the texture of the soil and subsoil of this type:

Mechanical analyses of Porters black loam.

[Fine earth.]

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
7719	Oges Creek.....	Brownish-black loam, 0 to 12 inches.	11.63	5.32	12.36	11.50	22.46	7.74	30.62	10.00
7723	1 mile N. of Burnsville.	Loose, light loam, 0 to 10 inches.	15.97	4.10	15.08	13.00	23.38	6.64	25.18	11.38
7721	Mount Mitchell....	Loam or sandy loam, 0 to 10 inches.	9.85	5.44	6.46	5.30	10.86	5.56	33.04	33.34
7720	Subsoil of 7719.....	Brown clay loam, 12 to 30 inches.	6.18	7.90	11.94	7.26	14.22	8.52	32.46	17.54
7722	Subsoil of 7721.....	Loam or sandy loam, 10 to 36 inches.	6.24	5.94	10.12	6.80	13.78	6.90	30.74	25.72
7724	Subsoil of 7723.....	Loam, 10 to 36 inches.	8.77	3.10	8.36	8.26	18.96	11.70	20.70	28.74

Report of Bureau of Soils, U S Dept Agr., 1902



TYPICAL MOUNTAIN TOWN IN THE MOUNT MITCHELL AREA, NORTH CAROLINA, SHOWING THE NARROW VALLEYS AND ROUGH TOPOGRAPHY.

Unadapted to general agriculture on any extensive scale, but well adapted to fruit culture.

PORTERS SAND.

The Porters sand is a light-gray sand or sandy loam with a coarse sand subsoil. The soil is usually a fine sandy loam varying in depth from 7 to 12 inches, while the subsoil is usually a coarse sand, often running into partially disintegrated rock and sometimes into solid rock. The parent rock is occasionally exposed at the surface.

This soil occurs in several parts of the area, but is found most frequently in the belt of mica-bearing rocks. The mica is found in the pegmatite granite belts. This granite is composed of comparatively large individual particles of feldspar, quartz, and mica. When these weather they break up into sand or gravel; hence the character of the Porters sand.

There are two large areas of this type, one on the Toe River northeast of Burnsville and the other in the vicinity of Sprucepine and extending northward toward Yellow Mountain. Porters sand is usually found on the lower ridges and foothills, and seldom on the higher knobs and peaks. The fact that both soil and subsoil are quite porous in nature assures good drainage.

As stated above, this type is formed mostly from the large individual particles of feldspar, quartz, and mica in the pegmatite granite. This granite weathers easily to great depths, breaking up into large grains. Those near the surface become further decomposed in time and are mixed with fine sand and organic matter, forming the soil over the loose, large gravel and rotten rock of the subsoil.

The most important mineral feature of the type is mica, which occurs in relatively large proportions. This considerable admixture of mica causes the Porters sand to be regarded as a poor soil. With proper cultivation and fertilization, however, nearly all of the general crops of the mountains do fairly well. Corn, oats, fruit, and vegetables are grown. The soil needs careful handling because of its porous nature, which allows added fertility to leach out readily. The average yield per acre of corn on this type is 15 bushels and of oats about 20 bushels. No wheat is grown upon it. Cherries and peaches do exceedingly well, while cabbage and turnips seem to do nearly as well. Some areas of this soil are used for pasturage, and it is said to support a very good growth of grass.

The following table shows the texture of the soil and subsoil of this type:

Mechanical analyses of Porters sand.

[Fine earth.]

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
7733	Crabtree Falls....	Yellowish sand, 0 to 12 inches.	1.33	10.54	24.68	12.50	21.26	6.02	7.40	17.00
7735	Sprucepine.....	Brownish-yellow sand, 0 to 10 inches.	4.04	11.88	15.50	9.76	18.00	8.14	14.36	21.60
7731	Wood Mountain..	Grayish-yellow sand, 0 to 8 inches.	3.23	15.64	15.60	7.14	12.90	5.40	17.36	25.34
7734	Subsoil of 7733....	Sand or gravelly loam, 12 to 36 inches.	1.05	33.20	28.84	13.72	17.84	4.92	3.96	6.60
7736	Subsoil of 7735....	Coarse sand, 10 to 36 inches.	.48	10.80	20.86	15.86	21.56	7.96	10.20	11.76
7732	Subsoil of 7731....	Loose, porous sand, 8 to 36 inches.	.26	13.44	21.70	8.98	18.18	6.26	12.32	18.32

MEADOW.

The Meadow soil is of heterogeneous origin and its characteristics vary so greatly in different places that no description can be given which would be typical of the areas in general. It is always found along the stream courses and is the accumulation of material left in the valley bottoms in time of high water.

The streams of the area are generally so swift and the valleys so narrow that the conditions for the formation of meadow land are not usually favorable. The character of the materials forming this type varies in different parts of the stream course. Nearest the mountains it is intimately mixed with angular rocks of all sizes, while farther down these rocks become smaller and less angular.

Where the valleys are wide deposits of finer materials are found farthest from the stream courses. The Meadow in such localities is the most valuable soil in the area, in some places having been sold for as much as $100 per acre. It was the first soil to be taken up when the country was settled. It is very well adapted to every crop suited to the area, but seems especially valuable as a corn and grass soil. The average yield of wheat is not large, but as high as 80 bushels of corn have been frequently grown upon it, and 1½ tons of hay per acre is not an uncommon crop.

ROCK OUTCROP.

Certain areas on the accompanying map will be noticed as uncolored and marked by symbol. These areas are in the main either rock outcrop proper or so stony as to be entirely unfit for cultivation.

AGRICULTURAL CONDITIONS.

From the standpoint of agriculture this section of North Carolina is not so prosperous as the Piedmont country. The lack of development has not been due, however, so much to the lack of possibilities as to a lack of opportunities. The country was not settled as early as the more eastern parts of the State, and it is only in comparatively recent times that it has had any railroad facilities whatever. Formerly the railroads were so far away and the highways were so difficult of travel that it was not profitable to haul farm products to market. Live stock was the chief source of revenue, because the cattle could be driven to market. To this industry the comparatively mild climate, long growing season, and excellent grass are very favorable.

The possibilities of the area for the production of fruit and vegetables have been known for years among the natives. Apples, cherries, cabbage, and potatoes grew luxuriantly, but the lack of markets prevented the growing of these products on a commercial scale. Since railroads have come nearer, markets have opened up and farming has received a great stimulus.

It is found that apples do well anywhere in the valleys, due to the fact that the plateau has an average elevation of 2,500 feet, thus affording suitable climatic conditions. In the lower mountains it is found that apples do best in the rich black coves on the north side, while in the higher mountains, where it is much cooler, it is found that south coves are equally as good as the north coves, or perhaps even better.

None of the land above an altitude of 3,500 feet has ever been under cultivation. It can be said definitely that apples do well up to that height, almost regardless of location and kind of soil, but the black coves on the north side of the lower mountains and on the south side of the higher mountains seem best adapted to this fruit and afford the safest soils.

As to the possibilities of cultivation above 3,500 feet, nothing is known at present. Above an altitude of 5,000 feet the balsam fir comes in and the mountains are entirely covered with forests of this tree, presenting the same appearance as the mountains of northern New York and southern Canada.

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U.S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP
NORTH CAROLINA
MT MITCHELL SHEET

N. C. DEPT. OF AGRICULTURE
S. L. PATTERSON, COMMISSIONER
B. W. KILGORE, STATE CHEMIST

82°30' 20' 10' 82°
36° 50' 20' 10'

SOIL PROFILE
(3 feet deep)

Porters sand
Sac
Ssc

Porters sandy loam
Ssc
C

Porters black loam
Sc
C

Porters clay
C
C

Meadow

LEGEND
Ssc Sandy loam
Sc Loam
C Clay

LEGEND
Ps Porters sand
Psl Porters sandy loam
Pb Porters black loam
P Porters clay
M Meadow
Rock outcrop Stoniosoil

Soils Surveyed by Thos. L. Caine 1902

BASE MAP ENLARGED AND REDRAWN FROM U.S. GEOLOGICAL SURVEY SHEET

Scale 1 inch = 1 mile
Contour interval 50 feet

A. Hoen & Co. Lith. Baltimore, Md.

Field Operations Bureau of Soils 1902